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Metro infrastructure planning in Amsterdam: how are social issues managed in the absence of environmental and social impact assessment?

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ABSTRACT

Amsterdam's North-South Metro Line (NZL) megaproject has had a long eventful history. From the initial proposal in the 1990s, through construction in the 2000s to 2010s, to its opening in 2018, the NZL overcame many challenges. Several geotechnical incidents in the Vijzelgracht neighbourhood in 2008 cost the City of Amsterdam and the Dutch government millions of Euros. These incidents required complex recovery management actions, and there was a complete re-evaluation of the project, resulting in extensive reformulation of the project's communications and impact management strategies, and in more-transparent public participation. Despite NZL's significance, it never underwent any formal Environmental and Social Impact Assessment (ESIA), thus it provides an interesting case to consider how social impacts are addressed when there is no formal ESIA. Drawing on document review, semi-structured interviews, and a focus group, we considered the experiences of key decision-makers and project team members to learn how social impacts were assessed and managed over time in the absence of ESIA. We conclude that, when combined with appropriate urban governance frameworks, applying ESIA in urban and transport planning would improve the assessment and management of the social impacts of future megaproject infrastructure developments.

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Introduction

In an era in which it is normally expected that Impact Assessment (IA) is a key component of decision-making about infrastructure planning (Banham-Zakar et al. 2018), it is unusual to find examples where megaprojects are approved and implemented without mandatory Environmental Impact Assessment (EIA) and/or Social Impact Assessment (SIA). Most international agencies, multilateral donors, lenders and industry now require an integrated Environmental and Social Impact Assessment (ESIA) that evaluates the effects of the projects they sponsor and captures the interrelationships between society and the impacted environment (Dendena and Corsi 2015; Vanclay and Hanna 2019; Vanclay 2020). In the case of the Netherlands, however, despite a well-established Environmental Impact Assessment (EIA) system and practice (Wood 2003; Runhaar et al. 2013), urban transport infrastructure projects are not necessarily subject to formal ESIA. This is due to the screening regulations in Dutch law. Yet, megaprojects have many significant multi-faceted impacts: they cost billions of euros, transform local economies and environments, involve multiple private and public stakeholders, and are technically and politically complex (Van Marrewijk et al. 2008; Flyvbjerg 2014; Sanchez-Cazorla et al. 2016; Vanclay 2017). Although ESIA is

internationally recognised as an integrated process of acknowledging and assessing environmental and social impacts prior to planned projects, programs and policy initiatives (Dendena and Corsi 2015), SIA is not consistently enforced globally (Esteves et al. 2012; Parsons et al. 2019), nor is it a mandatory requirement in Dutch EIA legislation. Thus, research on projects in the Netherlands provides an opportunity to analyse how social impacts are addressed in projects that have no formal ESIA, and to consider the added value of ESIA in understanding, assessing and managing social impacts.

Amsterdam's North-South Metro Line (*Noord-Zuid Metrolijn*) (NZL) commenced operation on 22 July 2018 after decades of controversy. It first appeared in Amsterdam's city planning in the 1968 *stadsspoor* [city rail] strategic transport plan. Originally proposed to support Amsterdam's booming population and to reduce the number of vehicles in the city centre, the project experienced political, engineering and financial problems. Work was completely halted for about a year following safety concerns arising from geotechnical incidents in 2008 in the Vijzelgracht neighbourhood. Despite significant time delays, billions of euros in over-runs of public expenditure, significant loss of trust by the local community in the municipal government, and loss of its social licence to operate (Jijelava and Vanclay 2017, 2018), the Municipality eventually completed the NZL and

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claimed it as a success. The metro operator, GVB, also claimed there is growing popularity of the NZL amongst passengers (GVB 2019). The Municipality attributed this success to its revised communication strategy, which rebuilt community trust following the Vijzelgracht incidents (Schuurman and Sheerazi 2013; van den Ende and van Marrewijk 2019). The NZL provides the 'missing link' in Amsterdam's metro network, connecting the growing northern suburbs (Amsterdam Noord) to the historic city centre and the economic centre in southern suburbs (Amsterdam Zuid). Nevertheless, the social impacts arising from its operation – and should there be any future expansion of the metro network – will need to be addressed via the urban governance processes for land-use planning at the city level.

Given that there was no formal ESIA for the NZL, this paper explores how the social impacts of large-scale urban transport projects are assessed and managed in the absence of ESIA. We also provide recommendations to planners and decision-makers about how to better address social impacts. The specific questions investigated are: (1) How were the social impacts of the NZL assessed?; (2) How were they managed over time?; and (3) How might their management have benefitted from formal SIA?

This paper is structured in six parts including an introduction, background to the project (NZL), a brief methodology, an empirical section incorporating our research findings, discussion and further reflections on the implications of our findings for the future, and a conclusion. Our research findings primarily draw on document review, interviews with key decision-makers and NZL project team members, and a follow-up focus group with staff from the Municipality. We reflect on how decision-making around key issues in the NZL (e.g. project management, strategic planning, urban governance, community engagement, and the assessment and management of social impacts) influenced the social outcomes of the project. We conclude with recommendations on the need to identify, assess and manage social impacts of future urban metro infrastructure projects at different spatial scales, and suggest how this might inform future city planning.

Background to the North-South Metro Line

The NZL is a 9.7 km underground metro link connecting the office district of Zuidas in the South of Amsterdam, passing under the city centre to Amsterdam central station, and the residential suburbs north of the River IJ (see Figure 1). Six new stations were constructed: Europaplein, De Pijp, Vijzelgracht, Rokin, Noorderpark, Noord, and augmentations were made to include stops at two existing stations: Amsterdam Zuid and Amsterdam Centraal.

In the 1968 *Stadsspoor* (city rail) metro plan, four metro lines were conceived: two East-West lines, a Ring Line, and the NZL. However, construction of one East-West Line (later known as the East Line), which used a cut-and-cover technique that was very damaging to the existing urban form, led to community protests at Nieuwmarkt in 1975. This halted progress on all lines (Van Lohuizen 1989; Rooijendijk 2005; Valliant 2017; van den Ende and van Marrewijk 2019). New construction techniques that promised to be less damaging to the urban environment, and that were financially and technically feasible for tunnelling through Amsterdam's soft waterlogged soils, were identified in the 1980s, leading to the metro plan being reconsidered (Van Lohuizen 1989; van den Ende and van Marrewijk 2019). Several investigations supported construction of the NZL, but a municipal referendum in 1996 revealed limited public support for the project (Valliant 2017). However, an insufficient number of votes were cast in the referendum for the results to be binding according to Dutch law (van den Ende and van Marrewijk 2019).

Once financing was negotiated with the Dutch National government (which took several years), the construction of the NZL was approved by the Municipal Council of Amsterdam on 21 June 2000 (Valliant 2017). Investigations into the proposed project revealed sufficient merit, partly because of confidence in the new boring technologies, as well as the critical need to reduce automobile use, ensure accessibility, and promote liveability in the rapidly-growing city (Faithful and Gould Consult 2005). Following various re-alignments during design and lengthy procurement negotiations (especially relating to responsibility for risk), the final investment decision to proceed with the NZL was made on 9 October 2002. Pre-construction activities started in December 2002, with construction officially commencing on 22 April 2003 (Faithful and Gould Consult 2005).

There were significant geotechnical problems encountered during construction. The worst occurred in 2008 when a groundwater leak in the underground station cavity in the Vijzelgracht neighbourhood caused subsidence and damage to nearby houses, forcing the evacuation of people from their homes. Due to safety and geotechnical construction concerns, this halted the project for almost a year. However, construction recommenced in 2009 after an investigation known as the Veerman Committee, which reviewed the viability of the project and its increasing cost and timeframe, recommended that the project proceed.

The Veerman Committee concluded that the Municipality needed to: increase transparency in risk communication; improve the involvement of the public in the planning process; and increase compensation. A revised



Figure 1. Noord/Zuidlijn (Visser & Smit Bouw n.d.).

communications strategy was developed that focused on two-way communication and introduced online media to receive public complaints and feedback (Schoorman and Sheerazi 2013).

The project eventually opened on 22 July 2018 after 40 years planning and 16 years construction (Gemeente Amsterdam n.d.). The total cost of the project increased from the original contemporary equivalent of 1.4 billion euros (Faithful and Gould Consult 2005) to approximately 3.1 billion euros when the project was complete (Gemeente Amsterdam n.d.). Key aspects in the project history that are relevant to assessing and managing social impacts are summarised in Table 1.

Environmental Impact Assessment and the North-South Metro Line

Under the Dutch Environmental Management Act (*Wet milieubeheer* 1979) and Environmental Impact Assessment Decree (*Besluit milieueffectrapportage* 1994), at the time of the NZL, EIA was only mandatory for transport projects of a specific type (specifically metropolitan tramways, elevated or underground rail, bus lanes, or magnetic levitation railways) and that are more than 5 km in length and outside a built environment, or if they are in an environmentally sensitive area. Therefore, there was no legal requirement for formal EIA for the NZL.

Table 1. Timeline of key events relating to the North-South Line (compiled from Faithful and Gould Consult 2005; Soetenhorst 2011; Schuurman and Sheerazi 2013; Valliant 2017; Gemeente Amsterdam 2018 and interview data).

Date	Event
1968	The Municipal Council of Amsterdam agrees to start work on the East line and made plans to build the NZL as part of the Plan Stadsspoor. The Plan Stadsspoor was proposed to phase a metro network, which connected all neighbourhoods in Amsterdam. Four lines were conceived with two East-West lines, a Ring Line and a North-South Line.
1971	Construction of one East-West Line (which later became the East line) started, using a cut-and-cover technique.
1975	Riots broke out in the Nieuwmarkt neighbourhood. Protestors opposed city plans to demolish further housing. The proposal to build the NZL is removed and it is announced that the East line will be the only metro line in Amsterdam.
1980s	A 'sneltram' between Amstelveen and Amsterdam is investigated as an alternative to metro. A number of internal studies are conducted by the Municipality into the feasibility of constructing the NZL.
1988–1989	A metro line between the North and South of Amsterdam is publicly announced. A study is commissioned to investigate improvements in public transport.
1995	The NZL route is identified by the Municipal Council of Amsterdam and plans are released for public consultation. Project boundaries are defined in the landuse plan. Technical studies are undertaken to help the Municipality decide whether or not to proceed.
1996	The Municipal Council of Amsterdam decides to approve the project 27 November 1996 to request funding from the Dutch Ministry of Public Transport. Costs are estimated at 1.4 billion equivalent euros, with a delivery date of 2005. The Dutch Ministry of Public Transport (<i>Ministerie van Verkeer en Waterstaat</i>) commits to financing the project.
1996–1997	The Municipality decides to hold a public referendum on the NZL. On 25 June 1997, 65% voting against the project. However, the poll was non-binding because the number of voters was insufficient.
1997–2001	Further consultancy studies are conducted to quantify the risks of the NZL. The procurement process begins and negotiations begin. A subsidy is added to the overall budget for the compensation of risks and accepted on 21 June 2000 by the Municipal Council. The budget and sub-contracts are amended several times to include contingency for risks.
9 October 2002	The Municipal Council of Amsterdam makes a definite decision to proceed with the project with a start budget of 1,461 million (excluding risks).
December 2002	Pre-construction activities commence.
22 April 2003	Construction commenced.
2003–2007	Problems arise with the NZL management team and delays and costs experienced.
19 June 2008	A leakage occurs in the west wall of the building pit of Vijzelgracht station resulting in major soil subsidence of adjacent houses.
2008, 9–10 September	Further leakages occur causing soil subsidence in adjacent buildings at Vijzelgracht. Construction is halted.
March 2009	The Veerman Committee is enacted to provide advice to the Amsterdam Municipal Council.
June 2009	The Veerman Committee presents its report, advising Amsterdam to complete the metro line. It concluded that the project will take another 8 years and cost up to 3.1 billion euros. The Committee made over 40 recommendations about progressing further with the project, including that the municipality must communicate more openly and transparently with the people of Amsterdam and provide more compensation for inconvenience and damage experienced by residents and businesses.
September 2009	Construction recommences on the NZL following the decision to proceed from the Veerman Committee and allocation of additional funds.
2010	Boring successfully completed. There are further delays and project costs increased. A change in communications strategy with the aim to rebuild trust with the people of Amsterdam was officially implemented.
22 July 2018	NZL begins operation.

Strategic Environmental Assessment (SEA) was conducted in the Netherlands to assess the impacts of developments identified in strategic national, provincial and regional spatial plans, and transportation plans (Fischer 1999). For instance, SEAs were conducted for strategic plans of the province of Noord Holland, which included the NZL being part of the future transportation network. However, the outcomes of these assessments were not considered in the planning process of the NZL itself. During construction, the environmental permits required the contractor to identify management strategies and to monitor noise, vibration, surface water, groundwater, and soil movement. All of these issues were relevant to monitor, as they could lead to negative social impacts, for example, in terms of liveability (amenity) disturbance or property damage from subsidence. These impacts could be particularly significant for vulnerable groups (e.g. the elderly, disabled or young families) if left unmanaged. However, these requirements are very limited in comparison to current good practice SIA, which includes all social, cultural, psychological and health impacts felt or experienced at any social grouping level (Vanclay 2002; Barrow 2010; Vanclay et al. 2015).

Methodology

This research used a multi-methods qualitative case study approach that included document analysis, semi-structured interviews, and a follow-up focus group. Field inspection was undertaken so that the primary researcher (an Australian) would become familiar with any place names that would come up in interviews. The North-South Metro Line was studied because it was a megaproject, had significant social issues, and no ESIA had been conducted. It is also the most recently constructed metro line in a major city in the Netherlands.

Seventeen interviews, each of 1–2 h duration, were conducted during 2017 and 2018 with relevant key informants knowledgeable about the project. Interviews were conducted face-to-face and/or via email/phone/skype in English. Some interview materials were translated into Dutch and one interview was conducted in Dutch with an interpreter. The interview questions were semi-structured to allow for free-flowing conversation and focused on issues relevant to managing the social impacts of the NZL and

transport projects generally. The principles of ethical social research (Vanclay et al. 2013) were followed, and the research was conducted under a protocol approved by Macquarie University.

The questions were developed from a review of case study documents and our previous research (Mottee and Howitt 2018; Mottee et al. 2020) and were grouped under six key themes:

- (1) Business case, policy and strategic need
- (2) Planning approval pathway and assessment of impacts
- (3) Key political decisions, governance and proposal modifications
- (4) Initial and ongoing stakeholder and community engagement
- (5) Cost-over runs, funding arrangements and project management
- (6) Long-term socio-economic effects of the project; Long-term management and monitoring of social impacts

A focus group was conducted in January 2019 with representatives of the urban and transport planning departments of the Municipality of Amsterdam. Some of the focus group participants had been interviewees. The intention was to discuss the case and seek feedback on our findings from earlier interviews. The focus group representatives were asked to reflect on the following statements:

- (1) Feasibility and ex-ante assessments should have better considered social consequences and opportunities for the local community in the short and long-term.
- (2) Early public consultation during feasibility should have engaged all sections of the community, and placed greater value on their contribution to the design process.
- (3) The 'need' for the project should have been continually evaluated against the original social objectives during design planning phases and up until delivery.
- (4) The communication strategy post-Veerman committee allowed for flexibility in developing management strategies in response to social impacts as they arose, however, appropriate budgets and resources could have been allocated for managing social impacts from early stages of planning.
- (5) There was a disconnect between the assessment, management and reporting Follow-up of social impacts at the project-scale and city-wide scale.

The focus group and interviews were audio-recorded, and interviews transcribed using NVivo-11. Thematic coding and reflexive diary notes were used as part of the analysis.

Interviewees were initially identified in discussion with staff at the Municipality of Amsterdam and from a review of publicly available documents. A snowball approach was used to identify additional people to interview. Interviewees included: Aldermen (transport and planning); Urban Planners; Engineers; Project Managers; and Environmental and Stakeholder Engagement professionals who all worked for the Municipality at the time of the project. Not all focus group interviewees worked directly on the NZL project, but some had a role in planning future projects for the Municipality.

Reflections on assessing and managing the social impacts of the North-South Metro Line

In analysing our data, five themes that reflected interviewees' experiences and observations about assessing and managing the social impacts of the NZL emerged: engineering design and project management; strategic and landuse planning; stakeholder and community engagement; managing social impacts and risks; and the potential role of ESIA. We discuss them below.

Engineering design and project management

All interviewees emphasised that an early constraint on engineering design and project planning was the commitment by the Municipal Council of Amsterdam that there would be no demolition of houses. This was necessary because the problems experienced with the construction of the East Line – with its cut-and-cover technique, demolition of houses, and community protests – meant that the Council was not able to progress planning the metro network for fear of community opposition (van den Ende and van Marrewijk 2019). As one interviewee (a Municipal Planner during the 1970s and 80s) remarked, 'you might as well offer your resignation if you were to suggest expanding the metro in Amsterdam as a solution to its transport problems!'. The political decision that there would be no demolition of houses had significant influence on the engineering feasibility study during planning:

All kinds of studies were made and there was one big constraint – given the impacts of the construction process the East line had on the city, that was, **no demolition possible!** So, we really had to look into new technologies. [Project Manager]

Early engineering feasibility studies prioritised tunneling methods to convince the Municipal Council that the metro was feasible and posed no risk to the community or property:

In the late 80s, early 90s, we were convinced it was feasible. We then had to show that it's not only feasible, but actually doable. The only way of doing so was

implementing from the very start a very rigorous risk management philosophy. [Project Manager]

The focus on avoiding property impacts influenced route design in terms of using existing streets to avoid tunnelling beneath buildings. To achieve this, project management initially primarily focused on the technical and financial aspects of tunnelling in the special conditions of Amsterdam's soils. A former engineer recalled the project management team's unwillingness to accept that there may be additional costly risks and challenges due to inexperience with tunnelling in Amsterdam's soils:

That was the first thing, a one-liner, "We are boring, no problem". So, and then the second one-liner was, "we are going deep", a big depth, you understand? Then you have no problem. That was two one-liners that they used to continue to convince the people of Amsterdam that there was no problem. [Engineer]

Interviewees reflecting on the technology noted that this choice resulted in increased financial and non-financial costs to the public and the project due to: design changes to avoid houses; the deep excavation; prolonged construction periods; and safety investigations. Several interviewees involved in the stakeholder engagement and environmental management aspects of the project reported that the early focus on technical matters came at the expense of other priorities, including the assessment and management of social and environmental risks. Some felt that their expertise did not have equal weight in key project decisions. One interviewee noted that they had limited power within the organisation to question technical aspects of the project (such as station location, design and construction) as their role was to focus on the non-technical and soft issues. They also felt that they were not being properly informed about project risks, and therefore they could not adequately inform the public.

Ultimately, as another interviewee reflected, the majority of design and project management issues were technical rather than about the potential social impacts of the project:

They hadn't been thinking about what the [social] impact would really be and how it would be felt by people who live close by, or have their shops in the area. If you think it's a technical problem, with a technical challenge, your focus is on the technical. That's one of the real root causes of where things went wrong. [Stakeholder Engagement Professional]

The involvement of non-technical team members to help identify opportunities to maximise social benefits, such as locating metro stations near public facilities, was constrained by those project managers leading technical design. Several interviewees reported that an over-optimism about the risks and costs developed early in project planning, when the project managers and engineers prepared the business case. This

optimism also contributed to the view that there would be no significant impact, and therefore that no assessment of social or environment impacts was required. As one interviewee noted, 'we didn't make an environmental impact assessment ... because the environmental impact isn't that big'. Another interviewee involved in project management also acknowledged this optimism bias, and felt that too much confidence was placed in the tunnelling technology, 'today we know the risks that we identified, that what we thought to be proven technology, turned out to be not so proven after all.'

After the incidents at Vijzelgracht, the project management team's attitude shifted from a closed technical focus to a more open focus to incorporating social impacts into project management planning. Although those involved in stakeholder engagement during the construction period from 2002 to 2008 felt they had developed a good rapport with the public and had implemented good practices, they lacked top management support and resources. One interviewee noted that, it was 'the change of culture and attitude towards the environment and engagement' and a commitment to 'working together to solve problems and make decisions with contractors' that contributed to completing the new metro line. Another interviewee reflected on the change in attitude in the project's management in relation to the community and project timeframes as follows:

from a communication point of view, we had been telling them [the project director and construction team] from 2004, "make less noise, be aware of your neighbours" ... but they always chose [what was best] for the project [timeframes and construction]. And then finally after 2008 [the Vijzelgracht incidents], the constructor said "we need to find a balance between the people living there and the people working there". That was the moment that the managers of the project decided, "OK, we're not going to work in the evening, we're [only] going to work during the days". [Environmental Professional]

Strategic and landuse planning

Many research participants felt that public interest and the social need for the project featured heavily in strategic planning for the NZL. The 1960s metro plan documented the strategic justification for the project and formed the legal basis for the development of the municipal landuse plan for the NZL (*Bestemmingsplan*). According to one interviewee, the strategic justification for the project was promoted as being avoiding future social issues (e.g. traffic, congestion, pollution, over-crowding) arising from Amsterdam's growing population and transport issues in the long run. Accessibility and mobility were promoted as social benefits of the NZL, since it would

provide a quicker and more-direct public transport connection between the increasing employment opportunities in the South and the growing residential suburbs in the North (KPMG 1996). As one interviewee noted:

when you look at the line itself from a social impact point of view, it is really all about accessibility and mobility ... you can also identify the fact that it enhances the whole network, because it also makes other kinds of connections very attractive when you look at the travelling time. [Project Manager]

The Municipality, however, in obtaining the necessary permitting approvals, focused narrowly on noise, water quality, soils, subsidence, and associated property impacts. Overall, they considered the work to have low environmental impact:

The part of it in the north of Amsterdam, which is not under the ground, but just on the surface, you got some noise, but there's also a big road, and the road also makes noise. Well, in a legal way, it wasn't that much of a job. It was like a tram or something, like that, you don't need an environmental impact assessment for that. We did do some research, of course, we had to do some research on the noise aspects ... and I must say also, in those days, the environmental aspects of landuse plans ... were not taken as seriously as nowadays. [Environmental Professional]

One interviewee reflected on the social changes now occurring in Amsterdam as a result of the NZL, and highlighted the limited understanding of the project team at the time:

For me, the really interesting thing is the sociological impact in having an old city neighbourhood, like De Pijp, now being [only] four or five minutes from the north. That will change identities of neighbourhoods. For one part, there is a paradoxical feeling, like they've always been neglected, there's always been some criticism against it [the NZL], but on the other hand, there has been a little bit of fear of their identity being put under pressure, because these kind of gentrification processes will start, and the original people living in this neighbourhood will not be able to pay the increasing prices of the rents or the properties etc. ... We see that these kinds of processes are already taking place. But I don't think that they had that kind of idea about these kind of effects at the start of the project. It was more just, the aim was to try to connect neighbourhoods, try to bring them closer to each other, try to develop also the north part of the city. [Stakeholder Engagement Professional]

Another interviewee recalled that social impacts were considered by the Municipal Council in developing the landuse plan:

There was a very serious point made that the Vijzelstraat, where the line would run, would change into Manhattan, with expensive high buildings etc, so there would be a change, the height of the buildings, the height of the rents, the functions that could be there. Ordinary people

couldn't be living there then ... So, we had to make a landuse plan for the Vijzelstraat fixing all these things. So, you cannot demolish your building and go to a higher height, it is impossible. So that was a serious point and it was managed that way. [Former Alderman]

Another interviewee felt that consideration of social impacts was constrained by the limited opportunities in the 1960s for the public to meaningfully contribute to discussion about the need for the project. Even when there was opportunity to comment on the land-use plan in the 1990s, the interviewee felt that the feedback received was unable to challenge the already-approved earlier decision:

But where do we make the strategic decision and where do we think about all those ... detailed aspects, what's in it for the people in the north of Amsterdam?, what's bringing them to the city centre?. The discussion [during development of the landuse plan] was much more about the people who were against the North-South Line, who were much more focused on issues for the whole city, such as the whole historic city will collapse, as it [the project] is technically very risky. [Environmental Professional]

Thus, the way social impacts were perceived, identified and assessed during the strategic and landuse planning for the NZL was framed by the laws and processes for environmental permitting and landuse plans.

Stakeholder and community engagement

Stakeholder and community engagement was part of the project's mandate, with a manager appointed in the early 1990s dedicated to looking at the non-technical aspects and to lead a team of professionals who would liaise with affected people. One interviewee reported that the project team quickly came to the view that the project was too complex for the public to comprehend and give an opinion on, therefore consultation prior to construction was to inform rather than to engage with the public:

It was not participation in the sense of you can give your opinion and will work with you. No, no. Our opinion was that the technical project was so complicated and difficult that you cannot discuss it with non-technical people. So the whole communications was set up from that idea. [Environmental Professional]

Community opposition to the NZL in the 1990s focused primarily on the potential impacts to private property due to the boring, however, some people were also concerned with the effects of changes to public transport:

People feared the houses would collapse, because drilling [boring] was never done before, building such large stations deep underground, it was never done before, so that was the reason why a lot of people feared the project. And only a minority had

some problems with the changes in the public transport facilities. [Environmental Professional]

At the time, the project team were confident that the project design (i.e. tunnelling) would address the major concerns of the public, thus other concerns were dismissed. However, since the opening of the NZL in 2018, there have been several reports in the news and social media that those living in Amsterdam's North believe they have experienced a deterioration in public transport service by having to change modes of transport. Whereas before passengers used to be able to catch a bus from Amsterdam Central with a direct connection to the northern suburbs, now they have to take the NZL to the bus terminal at Noord, then change to a bus to reach their final destination (Van Leeuwen 2018; Jacobs 2019).

Other project team members we interviewed felt the project had successfully engaged with the public, given that many early route alignment changes were as a result of community consultations in the 1990s. During this period there were several information evenings, consultation points, and consultations with individual residents and landholders. However, one interviewee noted that some changes were the outcome of political influence. For example, the City District of Zuider Amstel wanted the location of a station entry for the RAI exhibition ground to be significantly changed, which was ultimately implemented. There were also contested negotiations related to the proximity of the NZL to the Beatrixpark, a green space in Amsterdam's South. A politically powerful group, 'Friends of the Beatrixpark', successfully lobbied to have the route changed. The subsequent alignment changes resulted in increased costs and risks, and shifted the route eastwards to Ferdinand Bolstraat in the suburb of De Pijp.

To accommodate this change in alignment and to address concerns about property damage in the De Pijp, the metro line and station had to be deeper and have a complex layered design, which increased construction cost, risk and timeframe (Soetenhorst 2011). Because of the increased construction time, citizens in De Pijp demanded additional compensation, given the anticipated noise and accessibility disturbance, which was likely to impact businesses and residents in the neighbourhood (Soetenhorst 2011).

Between 2004 and 2008, consultation activities included monthly meetings with community groups located near the new stations, roundtable meetings with the neighbourhoods, living room meetings with smaller groups of 3 to 4 households, and individual meetings with directly-affected community members (such as those who would have boring under their homes). However, interviewees involved in stakeholder consultation at this time

still felt that more needed to be done given the size of the project:

It wasn't enough, we were doing the repairs and the construction was going on, just as always. I mean, we tried to repair it by doing better communication, but in the end, if a project is this big, with this much nuisance, it's not enough. If the project takes that long, you can't ignore the neighbours for 10 years or even 15 years or 17 years. You have to limit nuisance and that's what only happened after the houses collapsed at the Vijzelgracht. [Stakeholder Engagement Professional]

Nevertheless, those involved with stakeholder engagement prior to 2009 felt that they had built trust with the impacted public. However, once houses were damaged in the Vijzelgracht incidents, the public no longer trusted the Municipality. At the time of the incidents, tunnel boring had not yet begun, so before the project could recommence, a significant amount of stakeholder engagement was needed to rebuild trust and rapport. Repairing this trust was the primary goal for the consultation strategy after the Vijzelgracht incidents:

what we really needed was to regain some kind of credibility, some kind of trust within the project ... And now the crucial aspect was reputation, credibility and belief of people in the organisation. [Stakeholder Engagement Professional]

Reflecting on the changes in stakeholder engagement since the Vijzelgracht incidents, interviewees noted the use of new methods to facilitate open, two-way communication and provide additional feedback. These new methods included the use of social media and the internet. Following the Vijzelgracht incidents, there was also a change in the public image of the project, as one interviewee reflected:

Technical people were no longer in the media anymore, different people and it was the people who did the work. Let the people who drive the machine and want to go home at the end of the day, let them tell the story. [Project Manager]

The communications strategy also focused on increasing the involvement of the construction contractors in the community engagement and media:

We gave them [the contractors] a face, like when we had meetings with local communities, we gave them a role in those meetings. We said we have to make them [the contractors] feel the impact in the neighbourhood, the sentiment, and the frustration. But also the other way around, the neighbourhood should start to learn [to know/understand] those people, that they are more than only people in orange jackets with helmets on. The moment you start recognising people, ... your relation [to them] changes, because you're not anonymous anymore. There's stories behind those people, there's stories behind where you work, so for

both sides, it worked very well. [Stakeholder Engagement Professional]

Two other project team members noted a complete shift in the way risks were communicated to the public, highlighting this as a shift in public engagement on key issues and in project culture:

Before [2009] we always told them, 'Don't worry, we're in control, nothing can go wrong'. Afterwards we told them that 'We are in control, but there still are risks, and this and this and this are the risks, and when they happen, this and this and this is what we are going to do'. This was quite a new approach and the city government was first quite shaky about it, but actually I think it worked very well. Because normal people do understand that when you are doing this kind of work, it is normal that there are risks. So when you tell them, 'Oh, there is no risk', they don't believe you. They believe you when you say 'Oh, of course there are risks, but we try to manage them as good as we can.' [Environmental Professional]

Although initially stakeholder and community engagement were not a major focus of the project, the shift in communications strategy and project culture following the Vijzelgracht incidents ultimately had a significant influence on building trust with the public and on successful project delivery.

Managing social impacts and risks

How social impacts were identified, assessed and understood in Amsterdam's planning processes influenced how impacts were managed during construction. Interviewees felt that the city's strong history of planning with people in mind meant that they felt much time was spent considering the social issues of projects upfront and as opportunities for improvement (rather than a burden) in planning. However, in the case of the NZL, the approach was to 'manage' social impacts by ignoring affected communities, rather than by addressing their concerns, as one interviewee reflected:

Nowadays we take them [social impacts] much more into consideration to see how we can get a win-win situation for the neighbourhood and the project. But at the time of the North-South Line, it was more of a burden to face as a project. You had to deal with the neighbourhood to get the project done, you tried to get them away as much as possible, keep them out, keep them silent and construct as fast as you can. [Environmental Professional]

Despite this negative reflection on community participation during construction, a key social impact management measure was the compensation strategy that was put into effect early in project planning in the 1990s, and intended to address the concerns of affected landholders, businesses and residents. Interviewees reported that the existing Municipality

compensation scheme for disturbance (e.g. noise and property impacts) arising from construction of essential public infrastructure was expanded for the NZL. An independent committee was created to determine eligibility and amount of compensation. Potentially affected community members had to apply to this committee to obtain compensation. One interviewee noted that the types of compensation included: inspections of building foundations (at the owner's expense) with repairs funded if issues were discovered and it was approved; physical measures such as additional noise insulation (e.g. double glazing); financial compensation for those near tunnel boring activities; financial compensation for loss of business income or if relocation was required; and individual compensation in specific circumstances, for example, hearing protection and/or relocation to a hotel during night-works or window-washing during periods of high dust.

Interviewees noted that managing the interface between the community and the construction site was always a challenge for the project team, particularly as the construction timeframes extended beyond what was anticipated and longer than what was notified to the public. One interviewee reflected on the size of the construction site and proximity to residences, noting the considerations the team made in accommodating local residents:

In constructing a 30m deep metro line, there was a huge technical constraint, but also to the people that were living there. We constructed a station 2 metres from their houses. They could literally lean out the window and almost touch the machines. Deciding where you make the metro, where it's going to be, is the first step in realising what the impact will be. And then the contracting, how you're going to build it, how much room does the contractor get, how big is his construction site, it's been a constant discussion with the North-South Line, how big can the construction site be. [Environmental Professional]

After the incidents at Vijzelgracht, the approach to compensation changed. As one interviewee reflected, with the outcome of the Veerman Committee and additional funds, the Municipality became more generous so people thought 'finally the city is listening!'. Interviewees noted this strategy of being more generous with compensation contributed to building trust and reduced litigation against the project. One interviewee reflected:

So actually we turned it around, so when there's damage within a reasonable area around where you are working, then we automatically assume that it is our fault, which costs us way less money than when they have to prove it and we have to research it. [Environmental Professional]

In addition to these management strategy changes, the Municipality agreed to buy the damaged homes

following the Vijzelgracht incidents, as the owners could no longer live there and it was unclear as to whether the damage could be repaired. One Alderman reported that their personal attitude to managing social impacts also changed how the project managed social issues: 'It helped that I considered treating them as I would myself.'

Interviewees reported that, although there was no formal overarching management plan for managing environmental or social impacts on the NZL during construction, there was a series of environmental permits that required monitoring and regulating noise and vibration disturbance on the community. As one interviewee noted:

The social impacts are, of course, [present] in the decisions that the decision-makers make very predominantly, although they may not even be aware of it. But we, still to this day, we don't have a system for it. Not for building new metro lines, not for building other structures, not for new buildings. Even now, we have a very indirect system for the permits you need. Several permits have social impact management in them ... We need hundreds of permits [for construction] ... We cannot work without looking at [social issues] ... The permits kind of have that function of an implicit management strategy for the project. [Environmental Professional]

Out-of-hours disturbance due to construction noise was identified as the key social risk to be managed by permits through the construction period. In addition to noise, interviewees reported that monitoring included subsidence (related to geotechnical and groundwater risks) and road obstructions. One interviewee also added that, post-2009, the Municipality's requirements for internal monitoring reporting increased: 'there was lots of reporting about complaints, the number of claims, the damages, the compensation.'

Another interviewee, reflecting on the lack of an overall management strategy at the whole-of-project scale noted that, while the lack of strategy minimised the burden in pre-planning, it would have been helpful to have a baseline strategy to evaluate progress against, rather than just permits in individual areas and to have resourcing and flexibility within processes to adapt and respond to changes:

Sometimes organic isn't a bad thing, if you have too much planning up front, the plan can be quite a big hindrance. These days ... we talk agile and flexibility, that is important, but it would be good if beforehand and also during some moments in the project that you re-evaluate where you stand and what is happening, so that you can have at least some kind of parameters or variables that you can monitor, which you can take into account to do something, to manage it. If it's only organic, that gives you very little structure or framework. [Stakeholder Engagement Professional]

The Veerman Committee investigation triggered a focus on (re)building trust, and opened the

opportunity for the public to become much more involved in developing social impact management strategies during construction. By 2011, interviewees noticed the success of the changed strategy, reporting that litigation against the project had declined and instead citizens were proactively engaging in the project to resolve concerns. As one interviewee reflected:

In a way, it is very good that the [community] groups have been organising themselves, being critical of the project, asking for accountability and openness and being prepared. If you look at how we've [the project] been having impact and hindering the neighbourhood, and still people are prepared to be constructive in meetings and think together with us to find better solutions, for example. It's quite surprising almost that there were people still at their homes up until the end, that spent a lot of their spare time in meeting with us and in trying to find better ways of executing the project with less hindrance. [Stakeholder Engagement Professional]

The incidents at Vijzelgracht also represented an important lesson for the Municipality in managing social impacts, as one interviewee described:

And I think that's the moment we as a project, the people at the North-South Line project, really learned that you have to have plans for the social impacts of the project, even though it's halfway through the project, not at the start or before the start. So in a sense, for other projects, it's also meant that we in Amsterdam take social impact as a given, a big impact in decision-making without having a set of rules or guideline to follow. [Environmental Professional]

Even in the absence of a formal social impact management strategy, the Stakeholder Engagement and Environmental Professionals working on the project were able to implement positive strategies that, along with the revised communications strategy post-2008, contributed to the successful project delivery.

The potential role of ESIA

Interviewees were asked whether formal ESIA would have helped improve the social outcomes of the project and/or whether it would have helped them in doing their job. There was a mixed response, however in general, it was agreed that social and environmental issues need to be given equal weighting in decisions about transport infrastructure. As one interviewee reflected:

I'm quite sure it would have helped during the early years of the project, when they were seriously thinking about 'what this is going to mean to the people living there, what is going to happen to them, and how can we prevent that from happening'. ... the whole focus was on the technical problems, safety. [Environmental Professional]

Interviewees noted that many environmental studies were undertaken during design, similar to the studies

that may be undertaken in formal EIA. For example, pre-construction soil testing to identify appropriate re-use strategies and economic assessments to quantify impacts on business trading due to temporary loss of street frontage. However, these studies were not considered in an integrated way. One interviewee reflected that these studies focused on engineering design:

the things involving the environment have been there for a very long time, like protecting water, protecting soil, protecting ecology. But the social aspects are not really part of this process, they're all the engineering things you want to know if you're constructing. [Environmental Professional]

Several interviewees noted that the NZL studies were predominately focused on justifying and understanding the cost, given the financial and technical risks to the Municipality. Despite this, two interviewees reported that the project could have benefitted from SIA:

I think it would be very good if we'd had an instrument like that [SIA]. It could be an integrated part of the assessments you have to do before you do these kinds of projects, definitely. I think we still have quite something to learn. [Stakeholder Engagement Professional]

Other interviewees noted there has already been a shift in the way projects are planned at the Municipality, as it is now mandatory for contractors to consider social issues in the construction tendering and permitting process through preparation of accessibility, liveability, safety, and communication plans (in Dutch, BLVC):

In Amsterdam, we have BLVC plans. These are one of these ticks you have to do. But it's to make an assessment like what are the risks, are we working in the street, this street should be open, then how can we manage the traffic better during those activities. Really, a good social assessment is not part of that. [Stakeholder Engagement Professional]

When asked about the potential role of ESIA, two project environmental team members reflected that ESIA would not have been appropriate nor effective because of uncertainty in the design and construction technique, and short political terms, as one interviewee reflected:

The problem is that you want to say something about the situation many years ahead, and at that moment you do not have all the details of your project, and all the details of the way the project will be realised ... which makes the discussion with politics difficult, because their scope is four years and even less, and it makes the discussion with the people in the city also very difficult. [Environmental Professional]

Applying ESIA in the Netherlands will clearly require a continuing shift in thinking about how social impacts are assessed and managed in project planning and in urban governance processes.

Discussion and reflections for managing future social impacts

The interviewees identified three key topics that are relevant for managing the social impacts of future transport megaprojects: project management and risk management; urban planning and community engagement; and management and follow-up.

Project management and risk management in megaprojects

Much has been written in the Dutch media and Dutch academic forums about the cost over-runs and project management problems of the NZL that were faced by the Municipality of Amsterdam, and how these issues negatively influenced the project. Flyvbjerg (2003, 2017) and others (e.g. Van Marrewijk et al. 2008; Siemiatycki 2010; Cantarelli et al. 2012a, 2012b; Lehtonen et al. 2017; Vanclay 2017) offer insights into understanding megaprojects, how they are planned and realised, and the challenges they face. They note that megaprojects are often characterised by failure to complete on time and within budget, and by the generally poor performance in terms of public support, as well as poor environmental, social and economic outcomes. Thus, it is not surprising that interviewees felt that project management and engineering design limited the assessment and management of social impacts. However, our research indicates that the key political decision to avoid demolition of houses had primarily influence of the project's outcomes in terms of financial and social costs to the public. This created a paradox given that other social impacts were generated in the effort to reduce the social impacts of primary (political) concern. Balanced consideration of technical options during strategic planning to consider engineering, environmental and social effects, and better engagement with the public about the true risks of the methods to be used, may have helped to develop a more suitable project alternative and better outcomes for the public. However, this requires a supportive organisational structure that facilitates cross-disciplinary discussions to ensure a balanced contribution from all perspectives early-on in project planning (Mottee et al. 2020).

Another contributing factor to the problems experienced was the over-optimism bias regarding the technology selected, design, and construction methodologies. The project managers and Municipality were influenced by this optimism during the early stages of the project. Optimism bias is frequently discussed in the literature and refers to the underestimation of the true cost and likely project timeframe, and overestimation of the benefits in order to obtain approval for a project, which leads to

cost overruns, delays and a failure to meet expectations (Siemiatycki 2010; Cantarelli et al. 2012a; Flyvbjerg 2014; Lehtonen et al. 2017). Van Marrewijk et al. (2008) noted that megaprojects often adopt technological innovations with poorly assessed risks that contribute to cost overruns. In high-cost, contested megaprojects, political pressure and strategic misrepresentation often play a role in 'pushing projects over the line', even where there is uncertainty, missing information, or a lack of public support (Flyvbjerg 2006; Sanchez-Cazorla et al. 2016; Mottee and Howitt 2018). In the NZL, these issues and the emphasis on technical design and construction timeframes contributed to undervaluing social impacts in the NZL's feasibility assessments and management. As interviewees suggested, further consideration of short and long-term consequences and opportunities for the people of Amsterdam may have led to a different outcome of the project in terms of cost overruns and social benefits.

As van den Ende and van Marrewijk (2019) found, the underestimation of social risks and the lack of public transparency about project risks contributed to the loss of trust by the public in the NZL and Municipality, especially following the Vijzelgracht incidents. The Stakeholder Engagement and Environmental professionals working on the project found it challenging to change the attitude of top management towards assessing and managing social impacts and openly engaging with the public. The approach to risk mitigation in environmental and social impact assessment and management (Franks and Vanclay et al. 2013; Glasson et al. 2013) would have facilitated better management of social risks and impacts throughout the project. This is because the key risks for projects are no longer only technical and economic, but also arise from changes in societal values that may be impacted by infrastructure development (Driessen et al. 2001; Cantarelli et al. 2012b). There are mutual benefits in aligning concepts, methods and global standards for project management and environmental and social impact management during the infrastructure project life-cycle (Purdy 2010; Arts and Faith-Ell 2012; Silvius and Schipper 2014).

Urban planning and community engagement

Historically, the Dutch approach to urban planning did include participatory planning, at least in that citizens should be included in plan-making processes (Woltjer 2002; Hoff 2003). Participatory planning and consensus planning use good practice stakeholder and community engagement while drawing on collaborative/communicative planning theories (Driessen et al. 2001; Sager 2002; Woltjer 2002). Additionally, '*inspraak*', the Dutch form of public participation, where stakeholders are invited to comment on plans in advance of a decision, is entrenched in urban governance

frameworks in the Netherlands (Arts et al. 2016). However, the social basis of the 1968 strategic decision for the metro plan was not revisited when the Municipality decided to proceed with the project in the 1980s and 1990s. Instead, community consultation and feasibility studies were limited to considering technical impacts and providing feedback on the integration of the NZL into a landuse plan, rather than questioning the need for the project. In the assessment and management of social impacts, there was a disconnect between project and city scales that was never addressed, which meant that the project team and Municipality inadequately considered the distributional effects of the project (such as the change in transport modes for people in Amsterdam North). There also appeared to be an unfair power distribution between stakeholders. Not all community members were able to contribute to the discussion and decision-making equally to achieve a just outcome, which Howitt (1993), Vanclay (2003) and Walker (2010) all noted that both EIA and SIA should seek to achieve.

The formal impact assessment processes and methods to identify, assess and manage social impacts typically applied during urban planning were absent in the planning approvals for the NZL. The Municipality considered the project to be of low environmental and social impact (given that the tunnelling technique avoided demolition) and legal advice was only to prepare a landuse plan to capture the landuse and property changes in the local environment. However, this process did not allow for adequate public scrutiny of alternative project options, nor the right to appeal the original decision to build the project.

Participatory planning processes were used during the 1990s, however, they were ineffective in addressing public concerns. While the Municipality informed and listened to citizens, many interviewees felt that these processes failed to build trust as they did not transparently communicate project risks, ultimately leading in 2008 to loss of the project's social licence to operate and thus preventing further construction. There was failure to apply good practice in stakeholder engagement moving beyond informing the public to engaging them on how to manage potential impacts (Stolp et al. 2002; Arts et al. 2016). There was an imbalance in power and influence during the consultations in favour of the Municipality and high-profile key stakeholders at the expense of those impacted along the final route. In the absence of participatory impact assessment to assess the initial strategic decision as well as subsequent decisions, opportunities to enhance social outcomes were missed. Impact assessment, especially SIA, would have facilitated a fairer and equitable distribution of effects, more collaborative and democratic decision-making, and better community participation in the management of social change issues (Hartz-Karp and Pope 2011; Esteves et al. 2012).

Applying SIA as a negotiation and conflict management tool (Barrow 2010; Prenzel and Vanclay 2014) may have assisted the pre-existing concerns the Municipality had with the public prior to and during construction.

While consultation practices improved after the Vijzelgracht incidents, this was primarily a public relations campaign to build trust and rapport and improve the project's image, rather than on reconceptualising social impacts or their significance. Identifying, assessing and managing the social changes enacted by interventions through SIA would have provided an opportunity to proactively prevent impacts and improve trust before construction commenced (Vanclay 2002). Where EIA is undertaken in the Netherlands, consultation is an accepted and valued part of the process (Runhaar et al. 2013). However, under current Dutch law, the NZL would still not require EIA or SIA, although the inclusion of transport projects in Strategic Spatial Plans and Landuse Plans is subject to extensive formal public participation and usually a SEA. As such, consultation plays an important role in empowering participation in decision-making. With the introduction of the new Dutch Environmental Act [*Omgevingswet*] in 2021, there will be a greater emphasis on inclusion of people in infrastructure planning and EIA (Informatiepunt *Omgevingswet* 2019).

Management and follow-up of social impacts

The management of social and environment risks and impacts during construction of the NZL was part of the project management team's mandate from early in the project. The project team had dedicated staff who considered non-technical aspects, including stakeholder consultation, compensation and the management of environmental permits. However, an overall environmental and social impact management strategy was never established to track progress against project goals and holistically regulate environmental permits. This meant that monitoring of impacts was fragmented, focusing only on particular aspects of the permits in local neighbourhoods, rather than on wider social risks for the project and the wider urban area. Those involved did not have oversight of social issues to identify where there were potential issues or improvements to be made. Using SIA from project onset would have helped decision-makers understand the distribution of effects and identify which social indicators should be used to monitor social changes and impacts at different spatial scales.

The change in management approach and the allocation of additional funds for proactive compensation increased engagement with neighbours and facilitated a re-prioritisation of social impact management that contributed significantly to the ultimate success of the project. However, interviewees noted

that the absence of an overarching environmental and social impact management strategy from the beginning of the project was problematic, and would help manage the social impacts of future projects. As noted by some interviewees, adopting an ESIA approach to consider social impacts could have helped develop an overall management strategy for mitigating social and environmental impacts, for example, through a Social Impact Management Plan (Franks and Vanclay 2013). ESIA would have helped the project team develop a monitoring strategy to track progress and success factors against baseline social indicators and in subsequent follow-up management (Morrison-Saunders and Arts 2004; Pinto et al. 2019). Adaptivity and flexibility in management strategies facilitate better social outcomes from projects and helps manage uncertainty in design and planning (Storey and Jones 2003; Storey and Noble 2005). In the case of the NZL, adopting this approach would have provided the team with a mechanism to be proactive and responsive to the needs of the project and the people of Amsterdam.

Conclusion

When the Municipality of Amsterdam was planning its metro system, rapid growth, urbanisation, accessibility, and excessive numbers of automobiles were complex challenges that transport and urban planners had to address. Since then, there has been much progress in the urban planning discipline that helps decision-makers evaluate urban transport options and assess, manage and measure success against social outcomes (Legacy 2016). Our research reveals that the Municipality of Amsterdam has learned much from their experiences with the North-South Line, leading to improvements in how they plan transport, integrate urban development with transport, and how their contractors should interact with affected communities. However, in the absence of formal ESIA, we cannot conclude from this research whether social impacts would be sufficiently considered alongside technical and financial aspects in feasibility studies undertaken by the Municipality in the future. Furthermore, given Dutch law, new projects of this type in any city in the Netherlands still would not trigger an ESIA. This is because consideration of social impacts by project managers and urban planners remains discretionary as Dutch urban governance processes do not mandate ESIA for all projects. When the Municipality completes its (ex-post) impact evaluation of the project (expected in 2020), we may then learn about the impacts the project has had at different spatial scales and on different social groups, and how other metro projects might transform the city of Amsterdam.

Even in the absence of formal ESIA management strategies to mitigate effects, positive social outcomes

during construction were still achieved by the NZL. However, the efforts of the Stakeholder Engagement and Environmental Professionals alone were inadequate to sustain the reputation of the project and Municipality following the Vijzelgracht incidents, given the closed communication regarding the reality of the project's technical risks and the optimism bias that existed. The NZL case highlights the benefits of good practice in stakeholder engagement, particularly in building and maintaining a project's social licence. The more-transparent two-way communication strategy introduced in the aftermath of the Vijzelgracht incidents presented an opportunity to engage with the local population in developing social impact management strategies. The successful social outcomes achieved in implementing this strategy exemplify the importance of adequately valuing social issues and risks alongside financial and technical issues in megaproject management.

We argue that the benefits of a good ESIA process, in particular, in engaging and empowering community participation, prioritising public needs in design alternatives, identifying social risks and impacts, and applying adaptive management strategies, remain critical to planning today's cities. The challenges identified by Stakeholder Engagement and Environmental Professionals during the NZL in identifying social impacts and maintaining management oversight of social and environmental issues over time are issues that can be addressed using impact assessment and adaptive management practice. The application of good practice ESIA, even if not required by formal regulatory frameworks, can benefit urban planners in managing the social impacts of megaprojects, if applied in alignment with effective megaproject management and urban governance frameworks. Given ESIA's project-oriented focus, careful integration with urban governance frameworks is needed to strengthen the connection of major projects to wider policy goals, while also managing local impacts and maintaining focus on the public interest in megaproject planning, from onset to operation and beyond.

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